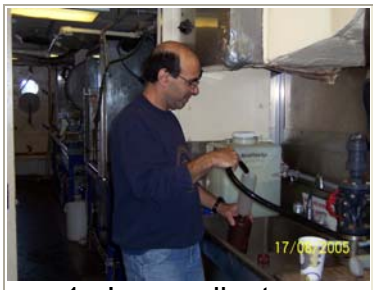
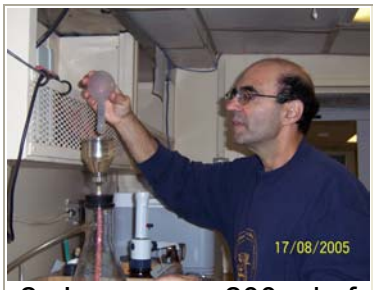
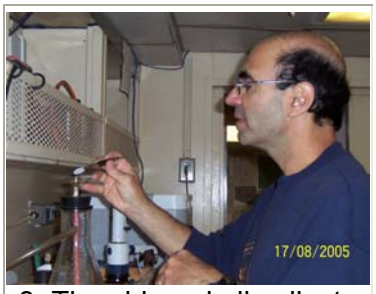
Day 7



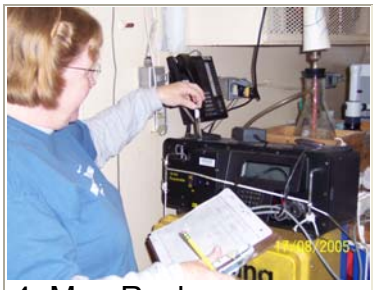
1. Jerry collects a seawater sample to filter for chlorophyll.



2. Jerry pours 200 ml of seawater into the filter funnel.



3. The chlorophyll collects on a small white filter as the water runs through it.



4. Mrs. Raybourn uses a flourometer to read a chlorophyll sample.

5. Mrs. Raybourn looks at some zooplankton under the microscope.

6. Cirrus clouds just before sunrise off the stern of the Albatross IV.

Date: August 20, 2005
Time: 21:00 GMT 5:00 p.m. EDT

Latitude: 42°17’ N
Longitude: 69°38’ W
Wind direction: SE (130 degrees)
Wind speed: 10.3 knots
Air Temperature: 19°C
Sea water temperature: 21.8°C
Sea level pressure: 1016.5 millibars
Cloud cover: High, thin cirrus

Question of the Day: Based on the caption for photo #6 above, in which direction was the Albatross IV traveling when the picture was taken?

Yesterday’s Answer: Our location at 41.39 N and 67.11 W means our goldfinch was 160 nautical miles from Woods Hole. A nautical mile is equal to one minute of latitude and is slightly longer than an ordinary land mile.

Science and Technology Log: In addition to collecting zooplankton samples, we also collect water samples and measure the amount of chlorophyll they contain. Phytoplankton are too small to see, but an instrument called a flourometer can measure their presence. The flourometer shines a beam of light through the water sample and measures how much blue light (fluorescence) is present.

This process is fairly delicate and great care must be taken to get a good representative water sample, and then not to contaminate it during processing. Water samples are collected in two ways: some are collected in water bottles that are attached to the bongo cable, and others are collected from a hose that is pumping sea water into the plankton lab. In picture #1 above, our chief scientist, Jerry Prezioso, is collecting a sample from the plankton lab hose. The sample itself is poured through a filter into the bottle to remove any large particles that may be present. Then 200 ml of the sample water is pumped through a fiberglass filter (picture #2). The filter traps chlorophyll as the water passes through. Even though the large amounts of chlorophyll in land plants gives them their bright green color, the small amounts present in phytoplankton are not visible, so you can't see it on the filter. In picture #3, Jerry uses tweezers to remove the filter (a small white circle) and place it into a cuvette, which is a small test tube. The cuvette contains acetone, which preserves the sample. Then it is placed upside down in the cooler for 12 to 24 hours, which allows the chlorophyll on the filter to wash out into the acetone.

When the sample is ready to be measured, it is taken out of the cooler along with a "blank", a cuvette of plain acetone with no chlorophyll present. The two cuvettes must warm up a little before they are read, because water condensation on the outside of the cuvette can result in a false reading. We use the flourometer to take three separate readings. When we do science investigations at school, we determine which factors are constant (kept the same for each trial) and which are variable (the thing you are changing in each trial). In this case, the variable is the amount of chlorophyll on the filter. In order to make sure we are measuring only chlorophyll, we also "read" two constants: a solid standard, which is contained in its own tube and used for every trial, and the blank containing only acetone. After the chlorophyll sample is read, we can compare the three sets of data to see how much chlorophyll is really there. In picture #4, I am putting a cuvette into the flourometer, which will shine a light through it and display a number value. The numbers for the solid standard, the blank, and the chlorophyll sample are all recorded on the clipboard along with data such as date, time, and where the sample was collected. Later, the data will be entered into a computer for further analysis.

Why do we want to know about chlorophyll in the ocean? Well, chlorophyll is produced by plants, in this case, phytoplankton. By measuring the amount of chlorophyll in the water samples, scientists are able to determine how much

phytoplankton is present. Since phytoplankton is the base of the ocean food web, it is one more piece of the ocean ecosystem puzzle.

Personal Log: Today I switched from the day watch to the night watch, but the timing was good because we had a long steam between stations and I was able to get a little extra sleep before doing a double watch. While all the scientists usually eat meals together, we work in teams to cover the watches, so I will be working with a different set of people. I am now on watch from noon to 6:00 p.m. and from midnight to 6:00 a.m. We will be working our way north for the next week, and the probability of seeing whales is increasing. That will be exciting!

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